

**Claims**

1. A printing control system for ensuring one or more users of a network (such as a LAN: local area network, or a WAN: wide area network) secure access to a print job designated to said one or more users of said network, and said printing control system comprising:
- (a) a client station of a first plurality of client stations for designating said print job to said one or more users, said print job defining a document containing user readable information and defining a header containing document access information,
- (b) a spool connected to said client station for spooling of said document and substituting said document in said print job with a spooled document,
- (c) a job database connected to said spool for receiving said spooled document and said header from said client station, said job database defining a document table and a user table and storing said spooled document in said document table and storing said header in said user table,
- (d) a printer communication unit of a second plurality of printer communication units for receiving user identifying data input by said one or more users to said printer communication unit,
- (e) a server managed by a network administrator and interconnecting said printer communication unit to said job database for establishing said one or more users in said user table enabling said one or more users access to said network, for validating said one or more users on the basis of said user identifying data input to said printer communication unit against user information stored in said user table, and for ensuring said user identifying data and said user information provide said one or more users access to said spooled document,
- (f) a printer connected to said printer communication unit for receiving said spooled document from said job database and having a request input for receiving a print request from said one or more users and communicating said print request to said server, and
- (g) a print engine interconnecting said job database and said printer communication unit for compiling of said spooled document to be communicated to said printer through said printer communication unit, said print engine receiving said spooled document from said document table in said job database.

2. A printing control system according to claim 1, wherein said network is established by bus connections, by cable connections such as current carrying cables and/or optical cables, by wireless links such as mobile radio transmission links, infra-red transmission links or ultra-sonic transmission links, or by any combination thereof.
- 5 3. A printing control system according to claim 1 ~~or 2~~, wherein said document is constituted by a file configured in any binary format such as text format, comma or space separated variable format or any user or software defined format.
- 10 4. A printing control system according to ~~any of the claims 1 to 3~~, wherein each of said first plurality of client stations comprise a local memory, a display, a keyboard and preferably a local central processing unit such as constituted by personal computers, computer workstations and/or such as constituted by mobile communication clients like mobile phones or mobile communicators or any combinations thereof.
- 15 5. A printing control system according to ~~any of the claims 1 to 4~~, wherein said spool spools said document according to a data stream format such as to PostScript, PDF, IPDS, PCL, PCLXL or AFP format.
- 20 6. A printing control system according to ~~any of the claims 1 to 5~~, wherein said printing control system establishing a secure network by utilising secure networking procedures providing symmetrical and/or asymmetrical encryption in accordance with public and/or private encryption keys.
- 25 7. A printing control system according to ~~any of the claims 1 to 6~~, wherein said spool incorporates a port monitor for parsing said spooled document in order to determine data stream format such as PostScript, PDF, IPDS, PCL, PCLXL or AFP format, and further to determine print formats such as simplex, duplex, colour, page size, page rotation, tray, stapling, and number of pages said spooled document will constitute during printing of said spooled document.
- 30 8. A printing control system according to ~~any of the claims 1 to 7~~, wherein said job database is established on a memory storage unit accessible by said server such as magnetic storable hard disk, magnetic storable tape and/or magneto-optic storage disks on said server and having said user table and said document table allocated in storage spaces on said memory storage unit.
9. A printing control system according to claim 8, wherein said user table allocates a record space in said memory storage unit for said header, and said document table allocates a storage space in said memory storage unit for said spooled document.
10. A printing control system according to claim 8, wherein said user table allocates a

record space in said memory storage unit for said header, and said document table allocates a storage spaced in said memory storage unit for a pointer to said spooled document on said local memory of said client station or in said document table.

- 0 11. A printing control system according to ~~any of the claims 1 to 10~~, wherein said header contains information such as information regarding data stream format such as PostScript, PDF, IPDS, PCL, PCLXL or AFP format, print formats such as simplex, duplex, colour, page size, page rotation, tray, stapling, number of pages of said spooled document, access for said one or more users to said spooled document, a digital client signature, duration in which said one or more users is allowed access to said spooled document, and number of pages defined by said spooled document or any combination thereof.
- 0 12. A printing control system according to ~~any of the claims 1 to 11~~, wherein said server incorporates said spool, said job database and said print engine in a server memory.
- 0 13. A printing control system according to ~~any of the claims 1 to 12~~, wherein said printer communication unit comprises a front-end module for identifying said one or more users of said network and a control unit for providing an interface for said print engine and said server to said printer.
14. A printing control system according to claim 13, wherein said front-end module comprises a display for showing said one or more users accessible print jobs and operations menus, and comprises a keypad for providing an interface between said one or more users and said front-end.
- 20 15. A printing control system according to claim 14, wherein said display utilising cathode-ray tube screen techniques or said display utilising liquid crystal display techniques.
- 25 16. A printing control system according to claims ~~14 or 15~~, wherein said keypad is constituted by a general personal computer keyboard, a numerical keypad or a functional keypad.
- 0 17. A printing control system according to claim ~~14 or 15~~, wherein said keypad is constituted by a touch sensitive film mounted on said display so as to allow said one or more users to perform user operations by pressing said touch sensitive film in accordance with information showed on said display.
- 30 18. A printing control system according to ~~any of the claims 13 to 17~~, wherein said control unit communicates with said front-end module and said printer through a parallel connection, a serial connection, a local area network (LAN) connection, a

wireless connection such as a mobile radio transmission connection, an infra-red transmission connection or an ultra-sonic transmission connection, or any combination thereof.

- 6 19. A printing control system according to ~~any of the claims 13 to 18~~, wherein said front-  
5 end module comprises a iris scanner and/or a fingerprint reader for identifying said one or more users at said front-end module and/or preferably a card reader for reading card information from a card such as a credit card, a library card, a health insurance card, a driving licence card, a passport card, a membership card, a company identity card or an institutional identity card, said card information including  
10 information such as card user name, card user ID, card user credit, card user's access rights, card user's server address, card user identifying number, card issuing date, card identity number, digital signature of one or more of said client station of said first plurality of client stations or any combination thereof.
- 15 20. A printing control system according to claim 19, wherein said card utilises electronic storage techniques, electro-magnetic storage techniques, magnetic storage techniques, magneto-optic storage techniques, optic storage techniques or any combinations thereof for storing of said card information.
- 15 21. A printing control system according to ~~claims 19 or 20~~, wherein said user identifying data includes said card information and a first user pin code and wherein said user information stored in said user table includes system user name, system user ID, system user credit, system user's access rights, system user's server address, system user identifying number, system user PUK code, system user initiation date or any combination thereof, and a second user pin code.
- 20 22. A printing control system according to ~~any of the claims 19 to 21~~, wherein said card reader receives said card information from said card and communicates said card information to said server and said front-end module requests a first user pin code from said one or more users.
- 25 23. A printing control system according to ~~any of the claims 19 to 22~~, wherein said server establishes and validates said one or more users by identifying said user information in said user table on the basis of said user identifying data and by matching said first pin code with said second pin code or alternatively during first use of said card by matching said system user PUK code with an entered user PUK code and said server locating in said document table all print jobs designated for said one or more users and communicating titles of all print jobs designated for said

one or more users to said front-end display enabling said one or more users to select a print job or a multiplicity of print jobs.

- o 24. A printing control system according to ~~any of the claims 13 to 23~~, wherein said server receives a print job selection from said one or more users at said front-end module and said server providing said one or more users access to said spooled document in said document table in said job database upon validation of said user identifying data.
- o 25. A printing control system according to ~~any of the claims 14 to 24~~, wherein said server provides an opportunity for said one or more users to delete said spooled document from said one or more users' print job list, determine desired number of copies required of said spooled document, retaining printing of said spooled document in a draft version for a first price, view said spooled document on said display for a second price, print said spooled document on said printer for a third price and terminate further operations on said front-end module.
- 15 26. A printing control system according to claim 25, wherein said server deducts said credit of said one or more users of a first amount equal to said first price if said one or more users prints a draft version of said spooled document, a second amount equal to said second price if said one or more users views said spooled document and a third amount equal to said third price if said one or more users prints said spooled document, or said server establishing a client credit record for each of said client stations designating said one or more users deducts said client credit record of a first amount equal to said first price if said one or more users prints a draft version of said spooled document, a second amount equal to said second price if said one or more users views said spooled document and a third amount equal to said third price if said one or more users prints said spooled document.
- 20 27. A printing control system according to ~~any of the claims 1 to 26~~, wherein said printer communication unit is constituted by a personal computer, a work station, a mobile communicator or a mobile phone.
- 25 28. A printing control method for ensuring one or more users of a network (such as a LAN: local area network, or a WAN: wide area network) secure access to a print job designated to said one or more users of said network, and said printing control system comprising:
  - (h) designating said print job defining a document containing user readable information and defining a header containing document access information to

said one or more users by means of a client station of a first plurality of client stations,

- (i) spooling of said document and substituting said document in said print job with a spooled document by means of a spool connected to said first plurality of client stations,
- 5 (j) receiving said spooled document and said header from said client station at a job database connected to said spool, defining a document table and a user table in said job database and storing said spooled document in said document table and storing said header in said user table,
- 10 (k) receiving user identifying data input by said one or more users to a printer communication unit of a second plurality of printer communication units,
- (l) establishing said one or more users in said user table enabling said one or more users access to said network, validating said one or more users on the basis of said user identifying data input to said printer communication unit against user information stored in said user table, and ensuring said user identifying data and said user information provide said one or more users access to said spooled document by means of a server managed by a network administrator and interconnecting said printer communication unit to said job database,
- 15 (m) receiving said spooled document from said job database and having a request input for receiving a print request from said one or more users at a printer connected to said printer communication unit and communicating said print request to said server, and
- 20 (n) compiling of said spooled document to be communicated to said printer through said printer communication unit by means of a print engine interconnecting said job database and said printer communication unit, receiving said spooled document at said print engine from said document table in said job database.

25 29. A printing control method according to claim 28, wherein said method incorporating features as described with reference to said printing control system according to claims 2 to 27.